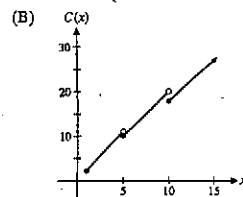


4. The graph of function G is a reflection in the x axis and a horizontal translation of 2 units to the left of the graph of $y = x^3$. An equation for $G(x) = -(x + 2)^3$.

5. (A) $C(x) = \begin{cases} 2.19x & \text{if } 1 \leq x < 5 \\ 1.99x & \text{if } 5 \leq x < 10 \\ 1.78x & \text{if } 10 \leq x \end{cases}$

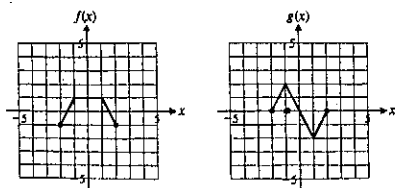


(C) The cost of 9 packs is \$17.91 and the cost of 10 packs is \$17.80. So always to the customer's advantage to order 10 packs instead of 9.

A Without looking back in the text, indicate the domain and range of each of the following functions. (Making rough sketches on scratch paper may help.)

- | | | | |
|------------------------|-----------------------------|--------------------|--------------------|
| 1. $f(x) = 0.4x$ | 2. $g(x) = 3x$ | 9. $y = f(x) + 2$ | 10. $y = g(x) - 1$ |
| 3. $h(x) = -x^2$ | 4. $m(x) = - x $ | 11. $y = f(x + 2)$ | 12. $y = g(x - 1)$ |
| 5. $g(x) = -2\sqrt{x}$ | 6. $f(x) = -0.5\sqrt[3]{x}$ | 13. $y = g(x - 3)$ | 14. $y = f(x + 3)$ |
| 7. $F(x) = -0.1x^2$ | 8. $G(x) = 5x^3$ | 15. $y = g(x) - 3$ | 16. $y = f(x) + 3$ |
| | | 17. $y = -f(x)$ | 18. $y = -g(x)$ |
| | | 19. $y = 0.5g(x)$ | 20. $y = 2f(x)$ |

Graph each of the functions in Problems 9–20 using the graphs of functions f and g below:



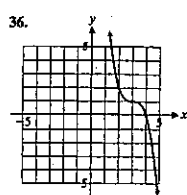
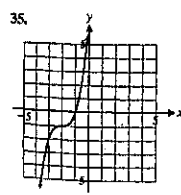
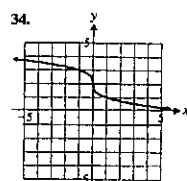
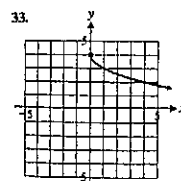
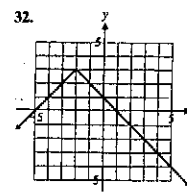
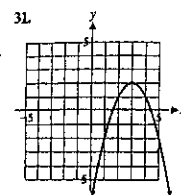
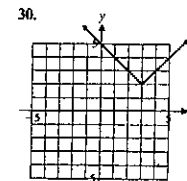
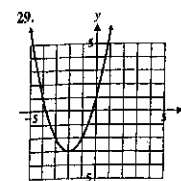
B In Problems 21–28, indicate how the graph of each function is related to the graph of one of the six basic functions in Figure 1 (at the beginning of this section). Sketch a graph of each function.

- | | |
|----------------------------|-------------------------------|
| 21. $g(x) = - x + 3 $ | 22. $h(x) = - x - 5 $ |
| 23. $f(x) = (x - 4)^2 - 3$ | 24. $m(x) = (x + 3)^2 + 4$ |
| 25. $f(x) = 7 - \sqrt{x}$ | 26. $g(x) = -6 + \sqrt[3]{x}$ |
| 27. $h(x) = -3 x $ | 28. $m(x) = -0.4x^2$ |

Check your descriptions and graphs in Problems 21–28 by graphing each function on a graphing utility.

horizontal translation for G is

Each graph in Problems 29–36 is the result of applying a sequence of transformations to the graph of one of the six basic functions in Figure 1 (at the beginning of this section). Identify the basic function and describe the transformation verbally. Write an equation for the given graph.



is \$17.80. So it is read of 9.

$x - 1$
 $x - 1$
 $x + 3$
 $x + 3$
 $x(x)$
 $x(x)$

Graph of each function in Problems 29–36 by graphing each function on a graphing utility.

$-|x - 5|$
 $=(x + 3)^2 + 4$
 $= -6 + \sqrt{x}$
 $= -0.4x^2$

In Problems 21–28, check your equations in Problems 29–36 by graphing each on a graphing utility.

Check your equations in Problems 29–36 by graphing each on a graphing utility.

In Problems 37–42, the graph of the function g is formed by applying the indicated sequence of transformations to the given function f . Find an equation for the function g and graph g using $-5 \leq x \leq 5$ and $-5 \leq y \leq 5$.

37. The graph of $f(x) = \sqrt{x}$ is shifted 2 units to the right and 3 units down.
38. The graph of $f(x) = \sqrt[3]{x}$ is shifted 3 units to the left and 2 units up.
39. The graph of $f(x) = |x|$ is reflected in the x axis and shifted to the left 3 units.
40. The graph of $f(x) = |x|$ is reflected in the x axis and shifted to the right 1 unit.
41. The graph of $f(x) = x^3$ is reflected in the x axis and shifted 2 units to the right and down 1 unit.
42. The graph of $f(x) = x^2$ is reflected in the x axis and shifted to the left 2 units and up 4 units.

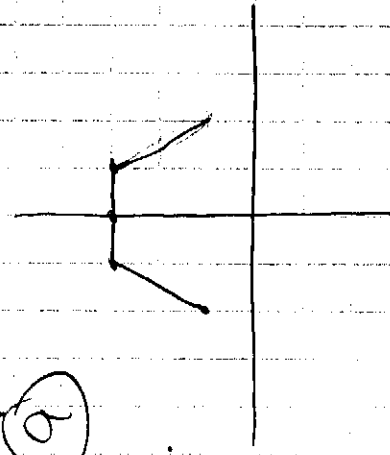
Graph each function in Problems 43–48 and find any points of discontinuity.

43. $f(x) = \begin{cases} x + 1 & \text{if } x < 0 \\ x - 1 & \text{if } x \geq 0 \end{cases}$
44. $g(x) = \begin{cases} x^2 - 1 & \text{if } x < 0 \\ 2 - x^2 & \text{if } x \geq 0 \end{cases}$
45. $h(x) = \begin{cases} -x & \text{if } x \leq 0 \\ \sqrt{x} & \text{if } x > 0 \end{cases}$
46. $k(x) = \begin{cases} \sqrt[3]{x} & \text{if } x \leq 0 \\ x^3 & \text{if } x > 0 \end{cases}$
47. $p(x) = \begin{cases} -2x & \text{if } x \leq -1 \\ \frac{x^2}{\sqrt{x-1}} & \text{if } -1 < x < 1 \\ \sqrt{x-1} & \text{if } 1 \leq x \end{cases}$
48. $q(x) = \begin{cases} \sqrt{x+2} & \text{if } x < -2 \\ \frac{1}{x} & \text{if } -2 \leq x \leq 2 \\ \sqrt{x-2} & \text{if } 2 < x \end{cases}$

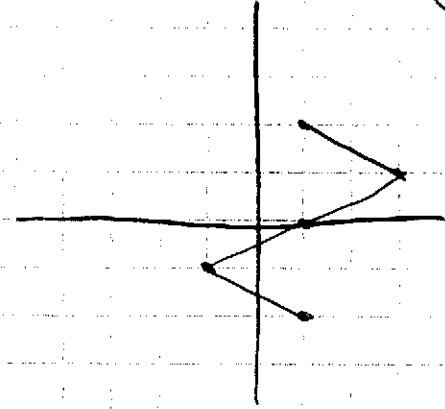
Check Problems 43–48 by graphing on a graphing utility.

p. 32-33 # 9-18, 29-32, 43-45, 47

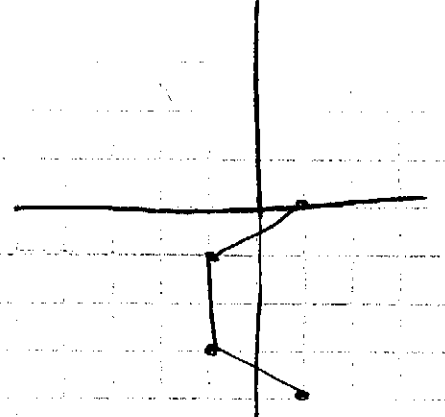
(9)



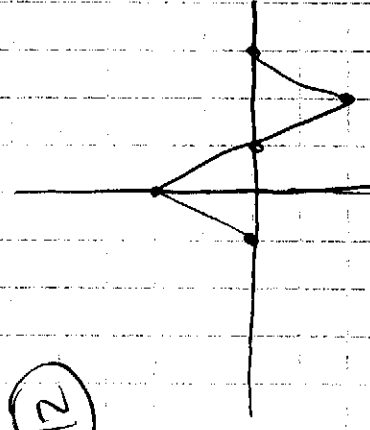
(10)



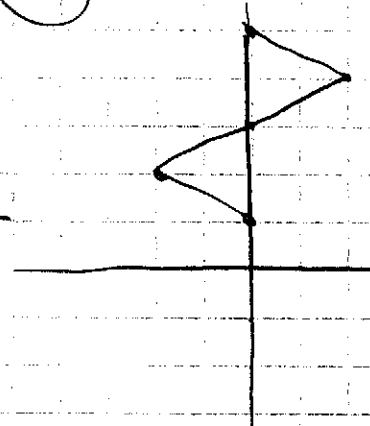
(11)



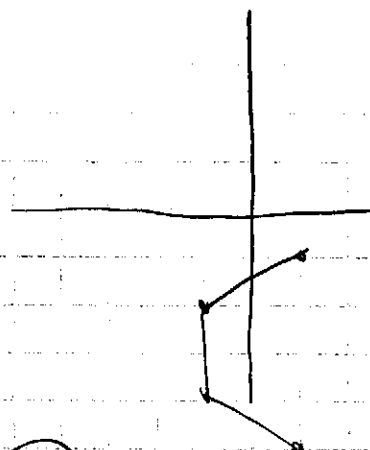
(12)



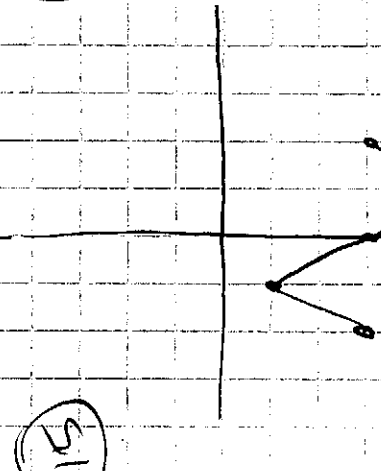
(13)



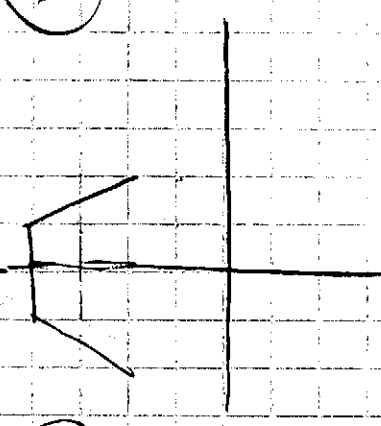
(14)



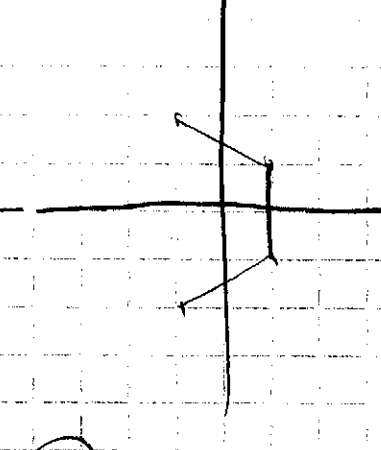
(15)



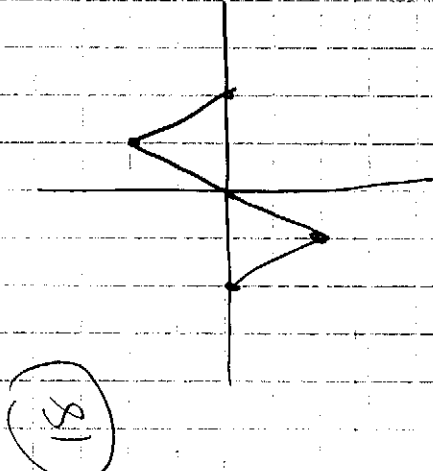
(16)



(17)



(18)



(29)

quadratic
 $\leftarrow 2 \downarrow 3$
 $y = (x+2)^2 - 3$

(30)

abs value
 $\rightarrow 3 \uparrow 2$
 $y = |x-3| + 2$

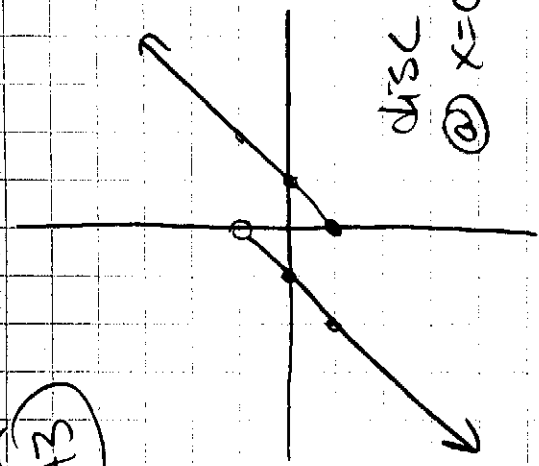
(31)

quadratic
 reflect over x-axis
 $\rightarrow 3 \uparrow 2$
 $y = -(x-3)^2 + 2$

(32)

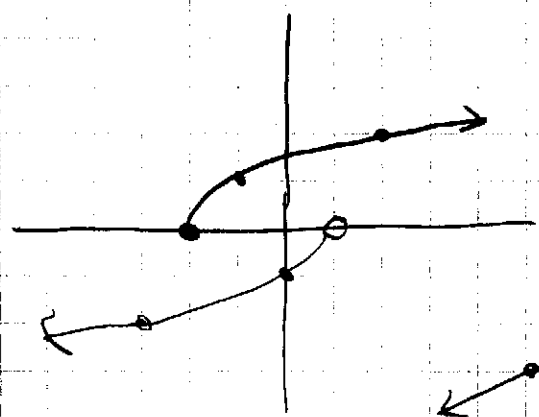
abs value
 reflect over x-axis
 $\leftarrow 2 \uparrow 3$
 $y = -|x+2| + 3$

43

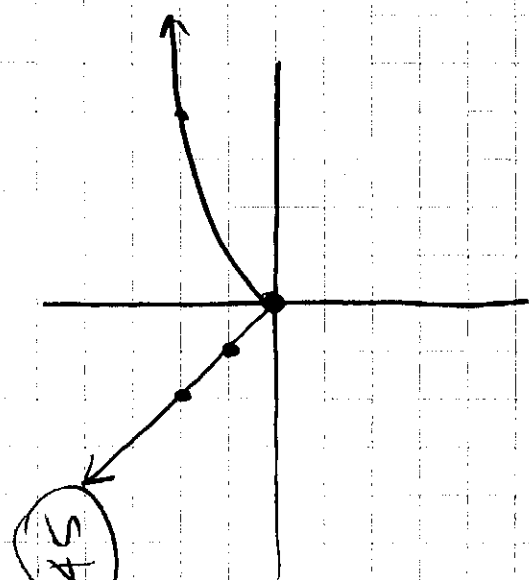


disc
② $x=0$

44



45



47

